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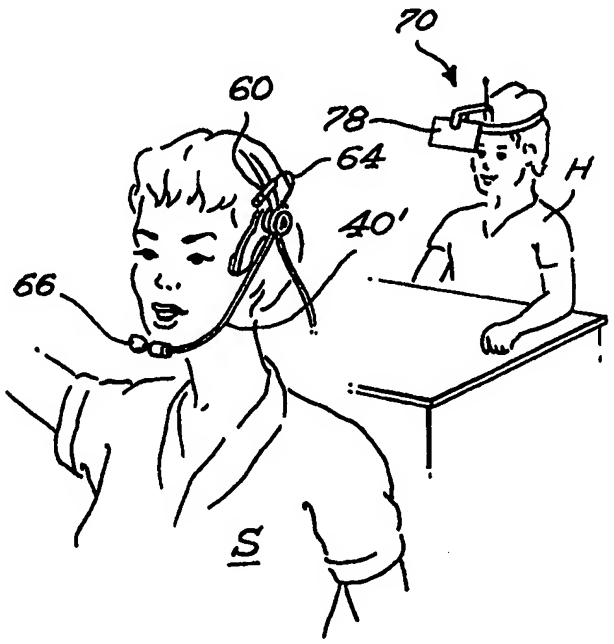
(54) Title: VIDEO–ASSISTED APPARATUS FOR HEARING IMPAIRED PERSONS

(57) Abstract

The apparatus for hearing impaired persons of the present invention comprises a telephone receptionist style headset which is to be worn by a speaker person on her head, in the conventional way. This headset is equipped with a frontwardly extending support arm which carries at its front free end a miniature camera (and also optional microphone) targetting the speaker's mouth. The camera is linked by a wire to a transmitter having intrinsic power means, which transmits the images caught by the camera by means of a wireless signal to receivers located remotely of the transmitter, e.g. on students' desks in a classroom. The receivers decode the signal and retransmits the images to television screens. Thus, hearing impaired persons can observe the screens for performing lip–reading of the speaker person, so as to understand the conversation, even though the speaker's mouth may not be visible from the distance to these hearing impaired persons at any given time. Alternately, the camera could be shifted back over an ear of the speaker person, and a mirror directed toward the camera placed instead ahead of the speaker's mouth, for reduced weight of the headset ahead of the teacher and therefore enhanced comfort by the speaker person.



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TITLE OF THE INVENTION: VIDEO-ASSISTED APPARATUS FOR HEARING IMPAIRED PERSONS

FIELD OF THE INVENTION

The present invention relates to aid apparatuses for hearing impaired persons, and more particularly to a video-assisted apparatus for hearing impaired persons.

BACKGROUND OF THE INVENTION

It is common for hearing impaired persons to use portable amplifier devices that can be hooked on and supported by the ear, and more particularly behind the auricle, with a semi-flexible pipe extending into the acoustic meatus. These devices amplify the sounds so as to allow the hearing impaired person to hear what is said. However, when the hearing disability is acute, or when the person is completely deaf, these amplifier devices may not be sufficient or may be entirely useless.

People with this acute hearing disability or complete deafness communicate via a sign language and via reading the movement of the lips of the person transmitting information. Even when the hearing disability is not extremely important, reading the lips of the interlocutor is common practice, and can be used currently with the hearing aid device, to help understand the sometimes less understandable pronounciation of a speaker person. When the speaker does not have free access to use its hands during conversation, especially teachers having to manipulate board chalks, notes for their courses or other items, the reading of the lips takes a particular importance, since sign language cannot be relied upon.

However, for the lip reading to be readily accomplished, the teacher must always face its class students. Moreover, the number of students is then limited, because of the maximum distance from the teacher

which can be tolerated, for lip reading by a student located far away from the teacher will be significantly hampered, if not completely impossible. Also, a teacher facing a particular portion of the class students would do so to the detriment of others. Finally, the teacher may not readily use the blackboard usually located at the front end of the class, behind him, while simultaneously talking, for he would then be turning his back to the class students, who could not see his lips and therefore could not accomplish the lip reading.

In an era where most types of professions are accessible to the hearing impaired or deaf persons, it is possible also that the teacher be called upon to manipulate machinery, work on wood components, or work in many other fields requiring hand held equipment, in which sign language is difficult, if not impossible, during the equipment operation, and in which lip reading can be difficult, depending on the equipment used.

OBJECTS OF THE INVENTION

It is the gist of the invention to provide an apparatus for allowing hearing impaired persons or deaf persons to understand a speaker by reading his lips, while allowing this speaker to have freedom of movement, especially of his head and hands.

It is an important object of this invention that this apparatus be light and uncumbersome for the person using it.

It is yet another object of this invention that many hearing impaired or deaf persons may simultaneously profit from this apparatus used by a single speaker, notwithstanding their position and distance relative to the speaker.

SUMMARY OF THE INVENTION

The present invention relates to a video-assisted apparatus for hearing impaired persons.

More particularly, the present invention relates to a video-assisted apparatus for use by a speaker and hearing impaired persons, comprising: a) a headset frame to be removably installed on the head of the speaker; b) a miniature camera (preferably also including an integral microphone) carried by said headset frame ahead of the person's mouth and destined to target the speaker's mouth for catching continuous video images (and optionally additional audio data) therefrom; c) a transmitter operatively linked to said camera, for coding the video images caught by the camera and for real-time transmission thereof as a signal, said transmitter including power means for powering said camera and said transmitter; d) at least one receiver, for receiving the signal from said transmitter and decoding it into video images; and e) at least one visualizing means operatively linked to one said receiver, for visualizing the images decoded by said receiver; wherein at least the lip movement and up to all facial expressions of the speaker can be followed in real-time simultaneously by any number of hearing impaired persons looking at the visualizing means, notwithstanding the head orientation or position of the speaker relative to the hearing impaired persons.

Preferably, said headset frame comprises a head-engaging portion, an elongated camera holding arm having a first end supported by said head engaging portion and a second end supporting said camera, first adjustment means for selectively adjusting the position of said arm relative to said head-engaging portion, and second adjustment means for selectively adjusting the orientation of said camera relative to said arm, wherein said camera can be positioned exactly ahead of the speaker's mouth.

Advantageously, said transmitter is located at a location on the speaker remote from said headset frame, said video assisted-apparatus further comprising a wire

linking said camera to said transmitter.

Preferably, said transmitter codes and transmits the images in either one of radio waves, micro waves and infra-red wave lengths, and transmits a wireless airborne signal to said at least one receiver. Preferably also, said video-assisted apparatus comprises a number of receivers each linked to a visualizing means.

Alternately, said video-assisted apparatus comprises one receiver linked to a number of separate visualizing means.

Preferably, said visualizing means is either one of a cathode tube monitor screen, a computer screen, a liquid emitting diode (LED) screen or a light-emitting diode (LCD) screen, or plasma display panel.

The present invention also relates to the use of a video assisted apparatus for helping hearing impaired persons in following the speech of a speaker, where said video-assisted apparatus comprises a portable miniature camera (and preferably also a microphone) removably installed ahead of the speaker and targetting the speaker's mouth, a transmitter operatively linked to said camera, for coding the video images caught by the camera and for real-time transmission thereof as a signal, said transmitter including power means for powering said camera and said transmitter, said apparatus further comprising at least one receiver, for receiving the signal from said transmitter and decoding it into video images, and at least one visualizing means operatively linked to one said receiver, for visualizing the images decoded by said receiver.

The invention also relates to a teaching aid system for assisting teachers in teaching hearing impaired students, comprising: a) a headset including a main rounded body, for fitting onto the head of a teacher, and attachment elements, for releasably attaching said headset body around the teacher's head; b) an elongated arm having an inner end integral to said

headset main body and an outer free end, said elongated arm shaped to follow the contour of the teacher's face and of a length sufficient so that its outer free end come in general register with the teacher's lips; c) a lightweight mirror element, integrally carried by said arm outer free end and in optical register with the teacher's lips, and including a lens of such a size and orientation as to be able to capture in full at least the lips of the teacher; d) a camera element, integrally carried by said headset main body and defining a lens having an optical path intersecting said mirror lens element, wherein at least the teacher's lips - and preferably the full face thereof - are fully visible to the camera lens element via optical reflection onto the mirror element lens; e) a video monitor element, adapted to be positioned ahead of a student and to be visually inspected by this student; and f) first and second transceiver elements, the former carried by said teacher and operatively coupled to said camera element, the latter operatively coupled to said video monitor element for realtime downlink of data transmitted by said first transceiver element.

Preferably, the spatial position of said mirror is laterally offset relative to the teachers' sagittal plane by an acute angle, in direct register with the teacher's cheeks. A microphone could then be carried integrally by said arm outer free end alongside said mirror element and in acoustic register with the teacher's mouth; and an audio speaker unit, to be mounted in close proximity to a student and in acoustic register with the student's ears, wherein said transceiver element further operatively connects said microphone to said speaker unit.

Alternately, the audio receiving unit could be directly coupled and operatively connected to an audio output unit, such as the hearing aids prosthesis used externally or internally of the ears by partly deaf

handicapped persons, or also to removable ear muffs for less handicaped or even unhandicapped persons.

Preferably, said acute angle is in the range between 30° and 45° - and most preferably of about 30° - relative to the sagital plane of the teacher, so that the student may gain dynamic isometric view of the teacher's moving lips to improve visual lip reading abilities of the students.

As an optional advantageous feature of the present invention, there could be added an additional video monitor element, for example an LCD video screen panel carried by a snap bracket to the teacher's belt, and adapted to be positioned generally speaking ahead of the teacher and to be visually inspectable by the teacher; and a third transceiver element, operatively coupled to said additional video monitor for real-time downlink of data transmitted by said first transceiver element; wherein the teacher will be able to constantly monitor whether her lips are continuously captured in full by said camera element, whenever said headset is accidentally displaced or removed and reinstalled on the teacher's head, and accordingly enable adjustment of said headset position if need be.

BRIEF DESCRIPTION OF THE DRAWINGS

In the annexed drawings:

Figure 1 is a perspective view showing a school teacher wearing a headset equipped according to a first embodiment with a miniature camera and according to the video-assisted apparatus of the invention, with two students located behind her at their respective desks, on which are installed video monitor screens;

Figure 2 is an enlarged perspective view of the first embodiment of headset and camera portion of the video-assisted apparatus, with the headset being partly fragmented so as to partly show the microphone therein

and with the camera support arm being partly broken, and suggesting with several arrows the possible headset adjustments for orienting and positioning the camera relative to the teacher's mouth and to compensate for various head sizes;

Figure 3 is a perspective view at an enlarged scale of a second embodiment of headset, where the camera is shifted rearwardly to a position close to the ear attachment member thereof, and with a convex mirror being carried ahead of the headset user with integral microphone;

figure 4 is an isometric view at a reduced scale of a professor wearing the second embodiment of headset and of a student against his desk wearing a second embodiment of head-carried video-monitor screen; and

Figure 5 is an enlarged lateral side elevational view of the student's head with the second embodiment of video monitor and sound transceiver unit.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Figure 1 shows a preferred embodiment of a video-assisted apparatus 10 for use by a speaker S and a number of hearing impaired persons H. Apparatus 10 comprises a headset frame 12 equipped with a small camera 14, a transmitter 16, a number of remotely located receivers 18 and an equal number of visualizing means in the form of video monitors 20. Monitors 20 may be e.g. a cathode tube (television), a lap top computer, an LED or a LCD video screen, a plasma display panel, and the like.

As shown in figure 2, headset frame 12 ressembles conventional receptionist-style phone headset frames and comprises a flat arcuate rigid headpiece 22 defining a first and a second end 22a and 22b, headpiece 22 forming substantially a 180° (half-turn) arc. Rigid headpiece 22 comprises a slight flexibility, to allow its

two ends 22a, 22b to be manually forcibly parted, to be inserted onto a person's head and thereafter snugly engage same, as will be explained hereinafter.

On headpiece first end 22a is fixed a triangular, rigid first abutment member 24, on the interior face of which a temple padding cushion 26 is provided for the comfort of the user's head.

Headpiece 22 frictionally engages and extends through a cylindrical socket member 28 and its second end 22b is provided with a circumferential stopper 30 that prevents socket 28 from accidentally releasing headpiece 22. By forcibly sliding headpiece 22 through socket member 28 against the friction force therein, an adjustment of the dimension of headset 12 is acquired to fit heads of different sizes, as known in the art. Socket member 28 is fixedly attached to a rigid, inverted U-shaped second abutment member 32 having a pair of downwardly extending legs 32a, with only one of these legs being shown in figure 2 for clarity of the drawing. Each leg 32a is provided with an interior padding cushion 33, for the comfort of the user's head.

The outer flat surface of cylindrical socket 28 is equipped with a small axially projecting stud 34 which frictionally snaps into a complementary hole 36 made through the inner flat surface of a hollow cylindrical dial 38 which rests against and axially and diametrally registers with socket 28. Dial 38 has a pair of diametrally aligned notches 38a, 38b axially extending in its cylindrical peripheral surface, opposite socket 28, through which a hollow, elongated cylindrical camera supporting arm 40 is installed. An inner grooved compression cap 42 engages and holds arm 40 at the position in which it is installed, due to a threaded outer cap 44 which threadingly engages dial 38 so as to apply axial pressure on compression cap 42 which frictionally traps arm 40 in notches 38a, 38b to prevent linear displacement thereof. Therefore, the position of

arm 40 can be selectively adjusted along dial 38 by removing caps 42, 44 and sliding arm 40 inside notches 38a, 38b, as suggested by arrow A1 in figure 2; the position of arm 40 can then be frictionally fixed relative to dial 38 by installing caps 42, 44 and threadingly tightening outer cap 44 on dial 38. Moreover, the angular position of arm 40 can be selectively adjusted by forcibly turning dial 38 against the friction force of stud 34 against hole 36, as suggested by arrow A2 in figure 2, and then releasing arm 40 at the desired angular position.

Supporting arm 40 defines a first and a second opposite ends 40a, 40b, with first end 40a being located proximate dial 38 and second end 40b supporting camera 14. Figure 1 further shows that arm 40 is elbowed at two intermediate locations, 40c and 40d, for ergonomically conforming to the general shape of the face of the speaker S, as is known in the state of the art headsets.

Camera 14 is of the conventional miniature type. Preferably, it has a main housing 14a being approximately cubic in shape with a side dimension of for example 1,25 centimeters. This miniature camera is small, uncumbersome and of light weigth, and therefore will not hamper or distract the speaker S when she is talking. Optionally, a small microphone 47 is further added, being mounted into a casing 14b integrally mounted transversely to housing 14a. Casing 14b includes a number of apertures 49 for free through passage and transmit them to remote transceivers, e.g. the portable hearing impaired persons' transceivers. As seen in figure 2, camera 14 is installed on a joint 46 rotatably mounted onto side casing 14b, and has a lens 48 destined to target the mouth of the speaker, as will be explained hereinafter. Joint 46 is shown to be cylindrical and thus allows up and down orientation adjustment of lens 48 by rotation of camera 14 according to arrow A3 in figure 2. In an alternate embodiment, not shown, joint 46 could

also be a universal ball-joint, allowing for rotation along all three perpendicular axes of camera 14, so that lens 48 may be selectively oriented in a great variety of directions.

Figures 1 and 2 suggest that supporting arm 40 is hollow, and houses a wire 50 connected to camera 14, running in arm 40 and protruding beyond the arm (tip) first end 40a and down behind the back of the speaker S. Wire 50 is plugged to transmitter 16 at its other (bottom) end, and thus would link both camera 14 and microphone 47 thereto. Transmitter 16 includes an intrinsic power means, preferably in the form of a 12 volts battery, for powering transmitter 16 and the camera (and the optional microphone 47).

In use, a speaker S, such as a teacher for hearing impaired children H as shown in figure 1, wears headset frame 12 on her head, and adjusts the position of camera 14 relative to her mouth, by means of the rotation of dial 28, of linear dispacement of arm 40 inside dial 28, and of rotation of camera 14 on joint 46. The purpose of adjusting camera 14 is for its lens 48 to precisely target the mouth of speaker S and to be located generally ahead of the speaker's mouth, so that the images caught by camera 14 are the images of at least the mouth and preferably also the full face of the speaker S.

These images (and the sound waves from the optional microphone 47) are transmitted through wire 50 into transmitter 16, which codes the images into a proper signal, preferably being either one of radio waves, micro waves and infra-red waves. This wireless signal is transmitted by transmitter 16, and received by a number of receivers 18 located on the desks of the hearing impaired persons H. The receivers 18 decode the signal sent by transmitter 16 into images (and sound in the above-noted option), that can be visualized by proper visualizing means 20, e.g. cathode tube (TV), lap top, LED or LCD screens, or plasma-display panels.

Thus, the hearing impaired persons H can read the lips of the speaker S at all times, even if she has her back turned to persons H, e.g. when she writes on a blackboard against the wall as suggested in figure 1.

Linking camera 14 to transmitter 16 by a wire 50 prevents transmitter 16 from having to be located on headset frame 12 proper, which may with time render same uncomfortably heavier. The camera 14 could even be shifted rearwardly away from the front outer end of arm 40, and replaced by a mirror (see figures 3-5, of which more later). With wire 50, transmitter 16 can thus be located on a remote location on the speaker S, for example attached to her belt as shown in figure 1. It could also be inserted into a shirt pocket or the like remote location. The purpose of this is to prevent this more heavy and cumbersome equipment from being supported by the speaker's head. It would be at least as convenient, however, that the transmitter be located on the headset frame head-engaging portion, including a small antenna thereon, especially if a lighter power means and transmitter assembly is available.

Figure 1 further shows that transmitter 16 comprises an enclosed battery section 16a, which may be distinct therefrom, wherein a power supply battery may be inserted.

In the alternate embodiment of figures 3-4 of the drawings, corresponding elements are primed relative to the embodiment of figures 1-2. Headset 12' is similar to headset 12, except for the following two main differences:

a) the heavy camera unit is not carried anymore at the outer free end 14 of arcuate arm 40, but rather, at the inner end of arcuate arm 40'. More particularly, the camera is lodged into a cylindroid casing 60 having a lens 62 at one end and a semi flexible elongated carrier arm or wire 64 at the other end, the latter wire being fixedly anchored to ring 38'. Casing 60 can be

manipulated to forcibly change the axial orientation 62a of the line of sight of lens 62, with semi-flexible arm 64 yielding to the pressure; but once manual bias is released, casing 60 will immobilize to maintain the lens line of sight 62a at the selected orientation.

b) a mirror element 66 is carried at the outer free end of arcuate arm 40'. Mirror 66 includes a lens 68 located in the line of sight 62a of ear mounted tubular camera 60. Mirror lens 68 is preferably convex, as illustrated, but could also have alternate shapes including a concave shape, provided the location of mirror 66 ahead of the teacher's face is such as to enable visual capture of the full face of the teacher including her lips. The optional microphone 47' is mounted integrally adjacent the mirror housing 66, in the same general way as it was attached to the camera mount 14a of the first embodiment.

It is to be noted that the preferred exact location of the camera 48 of the first embodiment, or mirror 66 of the second embodiment, ahead of the teacher, should not be directly ahead of the teacher's mouth, but rather at an acute angle relative to the saggital plane of the teacher. In particular, it is envisioned that an angular range of between 30 and 45° of lateral offset for the camera 48 or mirror 66 relative to the saggital plane, would be preferred. The reason for this is that, at that angular range, the camera 48 or mirror 66 would be in register with the cheeks of the teacher, while still remaining in visual albeit laterally offset visual register to the teacher's lips; such an isometric orientation of the camera or mirror would be advantageous since it would provide the unexpected result of clearly improving the lip-reading ability of the students, because a three-dimensional impression of the lip movements would be created at the level of the two dimensional visual reproduction on the students' video monitors 20 or 78.

A more simple while still acceptable embodiment of apparatus would include the following components:

1) Student: a) Video monitor - color Portavision 5 inches model, Radio Shack; or preferably, a LCD video screen, e.g. from Sony; b) FM receiver - model 900AMBBR, Microtech Electronics (San Clemente, CA);

2) Teacher: a) transmitter - FM wavelength emitter, model Minilink 001823, Microtech Electronics, with on/off switch;

b) 2 x 6 volts batteries, 1.2 Amp. "Exaltor"; c) micro color solid state board camera with 4.4mm diameter lens, and with digital processing, model UN411E ultra micro remote color CCD camera from "Elmo".

Obviously, the invention is not limited to such a given embodiment. The camera, in particular, may be one of many known miniature cameras sold on the market. The known technologies include optical fibre-based cameras, CMOS technology cameras, medical-type cameras (usually enclosed in a protective casing), or the above-mentioned solid state board camera. Also, it is envisioned that the transmitter be included with the camera (and the optional microphone) in a single casing.

Throughout this application, reference has been made to hearing impaired persons, but it is understood that completely deaf persons are included therein.

Any minor modifications brought to the present invention as described herein which do not extend beyond its scope, are considered to be included therein.

For example, although each student H in figure 1 is shown to have one receiver 18 and one visualizing screen 20 on his desk, it is understood that a single receiver 18 could be provided for a number of visualizing screens 20, e.g. if all the visualizing screens 20 were network-linked computer screens. Also, a single receiver could be linked to a single visualizing means in the form of a screen, preferably a giant-sized screen, facing all hearing impaired persons H. Also, although much more

cumbersome, copper or optic fiber wiring could be used to carry the signal from transmitter 16 to receiver 18 instead of airborne waves.

Figures 4-5 show an alternate video monitor system 70 for the students, which can be used with either the first embodiment of teacher's headset 12 illustrated in figures 1-2, or with the second embodiment of teacher's headset 12' illustrated in figures 3-4. Alternate video system 70 includes a head band 72, e.g. an elastic headband, from which transversely upwardly depends an elbowed rigid arm 74. Elbowed arm 74 forms a small obtuse angle, and transversely carries at its elbow a transceiver unit 76, for audio down-link with the corresponding transceiver unit 16 of the teacher's microphone 47 (or 47'). Moreover, rigid arm 74 further carries at its outer free end a transversely mounted flat screen video monitor 78, connected thereto by an adjustable pivot mount 80. The elbowed arm angle, the orientation of screen 78 from pivotal adjustment of pivot mount 80, and the size of flat screen 78 are such that the student's line of sight 82 to the teacher ahead of him is unhampered by the lower edge portion of the screen 78, which clears this line of sight 82, while at the same time enabling free and easy visual inspection of the video monitor screen 78 by the student along alternate raised line of sight 82'.

It is understood that the headset of the present invention could be modified and be of any suitable desired configuration, although the telephone receptionist style is convenient. Also, the camera support arm could just as well be located on the right-hand side of the headset, rather than on the left-hand side as shown in the drawings.

Moreover, the apparatus described in the present disclosure can be of use for persons without any hearing disabilities, particularly for children and teenagers located well away from a teacher and who will

use lip reading as complementary means for understanding the conversation; this method helps to focus the student's attention on understanding the meaning of the what is said, rather than solely directing his attention on hearing what is said.

I CLAIM:

1. A video-assisted apparatus for use by a speaker and hearing impaired persons, comprising:

a) a headset frame to be removably installed on the head of the speaker;

b) a miniature camera carried by said headset frame ahead of the person's mouth and destined to target at least the speaker's mouth for catching continuous video images therefrom;

c) a transmitter operatively linked to said camera, for coding the video images caught by the camera and for real-time transmission thereof as a signal, said transmitter including power means for powering said camera and said transmitter;

d) at least one receiver, for receiving the signal from said transmitter and decoding it into video images; and

e) at least one visualizing means operatively linked to one said receiver, for visualizing the images decoded by said receiver;

wherein at least the lip movements of the speaker can be followed in real-time simultaneously by any number of hearing impaired persons looking at the visualizing means, notwithstanding the head orientation or position of the speaker relative to the hearing impaired persons.

2. A video-assisted apparatus as defined in claim 1, wherein said headset frame comprises a head-engaging portion, an elongated camera holding arm having a first end supported by said head engaging portion and a second end supporting said camera, first adjustment means for selectively adjusting the position of said arm relative to said head-engaging portion, and second adjustment means for selectively adjusting the orientation of said camera relative to said arm, wherein said camera is positioned ahead of and is general

register with the speaker's mouth.

3. A video-assisted apparatus as defined in claim 2, wherein said transmitter is located at a location on the speaker remote from said headset frame, said video assisted-apparatus further comprising a wire linking said camera to said transmitter.

4. A video assisted apparatus as defined in claim 1, wherein said transmitter codes and transmits the images in either one of radio waves, micro waves and infra-red wave lengths, and transmits a wireless airborne signal to said at least one receiver.

5. A video assisted apparatus as defined in claim 1, comprising a number of receivers each linked to a visualizing means.

6. A video assisted apparatus as defined in claim 1, comprising one receiver linked to a number of separate visualizing means.

7. A video assisted apparatus as defined in claim 1, wherein said visualizing means is either one of a television screenm, a computer screen, a plasma display screen, a LED screen, or a LCD screen.

8. A video assisted apparatus as defined in claim 1, further including a microphone member, integrally mounted to said camera.

9. Use of a video assisted apparatus for helping hearing impaired persons in following the speech of a speaker, where said video-assisted apparatus comprises a portable miniature camera removably installed ahead of the speaker and targetting at least the speaker's mouth, a transmitter operatively linked to said

camera for coding the video images caught by the camera and for real-time transmission thereof as a signal, said transmitter including power means for powering said camera and said transmitter, said apparatus further comprising at least one receiver, for receiving the signal from said transmitter and decoding it into video images, and at least one visualizing means operatively linked to one said receiver, for visualizing the images decoded by said receiver.

10. A teaching aid system for assisting teachers in teaching hearing impaired students, comprising:

a) a headset including a main rounded body, for fitting onto the head of a teacher, and attachment elements, for releasably attaching said headset body around the teacher's head;

b) an elongated arm having an inner end integral to said headset main body and an outer free end, said elongated arm shaped to follow the contour of the teacher's face and of a length sufficient so that its outer free end come in general register with the teacher's lips;

c) a lightweight mirror element, integrally carried by said arm outer free end and in optical register with the teacher's lips, and including a lens of such a size and orientation as to be able to capture in full at least the lips of the teacher;

d) a camera element, integrally carried by said headset main body and defining a lens having an optical path intersecting said mirror lens element, wherein the teacher's lips are fully visible to the camera lens element via optical reflection onto the mirror element lens;

e) a video monitor element, adapted to be positioned ahead of a student and to be visually inspected by this student; and

f) first and second transceiver elements, the former carried by said teacher and operatively coupled to said

camera element, the latter operatively coupled to said video monitor element for realtime downlink of data transmitted by said first transceiver element.

11. A teaching aid system as defined in claim 10, wherein the spatial position of said mirror is laterally offset relative to the teachers' sagittal plane by an acute angle.

12. A teaching aid system as in claim 10, further including a microphone, carried integrally by said arm outer free end alongside said mirror element and in acoustic register with the teacher's mouth; and an audio speaker unit, to be mounted in close proximity to a student and in acoustic register with the student's ears, wherein said transceiver element further operatively connects said microphone to said speaker unit.

13. A teaching aid system as in claim 11, wherein said acute angle is in the range between 30° and 45° relative to the sagital plane of the teacher, so that the student may gain dynamic isometric view of the teacher's moving lips to improve visual lip reading abilities of the students.

14. A teaching aid system as in claim 1, wherein said visualizing means is a flat screen video monitor, and further including a student's head band, an elbowed rigid support arm having first and second opposite ends and fixedly mounted at one end to said student's head band, and a pivot mount element pivotally adjustably mounting said video monitor to the other end of said elbowed arm, wherein said video monitor is located at such a position as to be readily inspected visually by the student without the student's ligne of sight to the teacher being hampered.

15. A teaching aid system as in claim 10, wherein said video monitor element includes a student's head band, an elbowed rigid support arm having first and second opposite ends and fixedly mounted at one end to said student's head band, and a pivot mount element pivotally adjustably mounting said video monitor to the other end of said elbowed arm, wherein said video monitor is located at such a position as to be readily inspected visually by the student without the student's line of sight to the teacher being hampered.

16. A teaching aid system as in claim 14, further including a microphone, carried integrally by said headset frame alongside said mirror element and in acoustic register with the teacher's mouth; and an audio output unit, to be mounted in close proximity to a student and in acoustic register with the student's ears, wherein said transceiver element further operatively connects said microphone to said speaker unit.

17. A teaching aid system as in claim 15, further including a microphone, carried integrally by said arm outer free end alongside said mirror element and in acoustic register with the teacher's mouth; and an audio speaker unit, to be mounted in close proximity to a student and in acoustic register with the student's ears, wherein said transceiver element further operatively connects said microphone to said speaker unit.

18. A teaching aid system as in claim 13, wherein said acute angle is of about 30°.

19. A teaching aid system as in claim 10, further including

a) an additional video monitor element, adapted to be

positioned ahead of the teacher and to be visually inspected by the teacher; and

b) a third transceiver element, operatively coupled to said additional video monitor for realtime downlink of data transmitted by said first transceiver element;

wherein the teacher will be able to constantly monitor whether her lips are continuously captured in full by said camera element, whenever said headset is accidentally displaced or removed and reinstalled on the teacher's head, and accordingly adjust said headset position if need be.

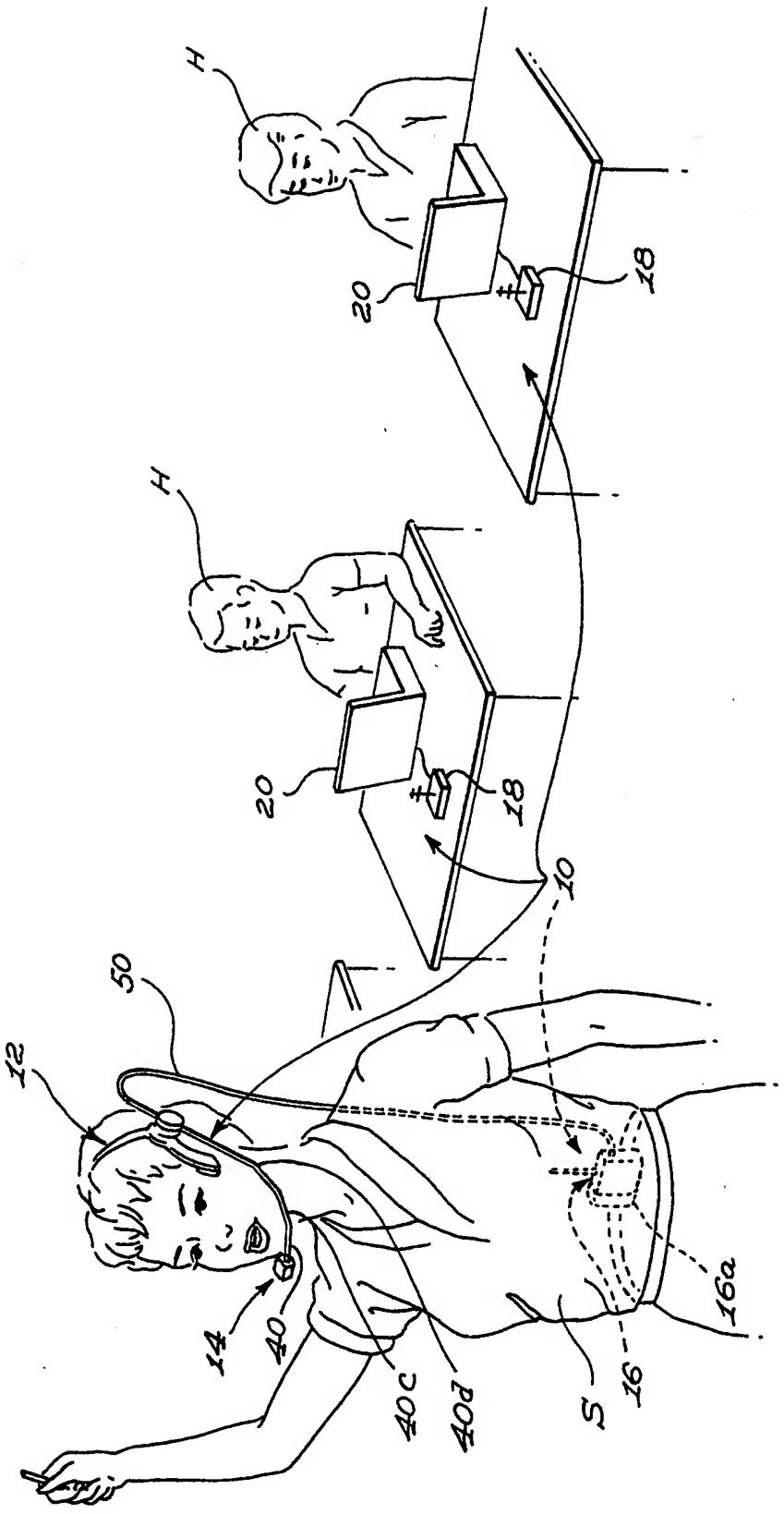

Fig-1

Fig. 2

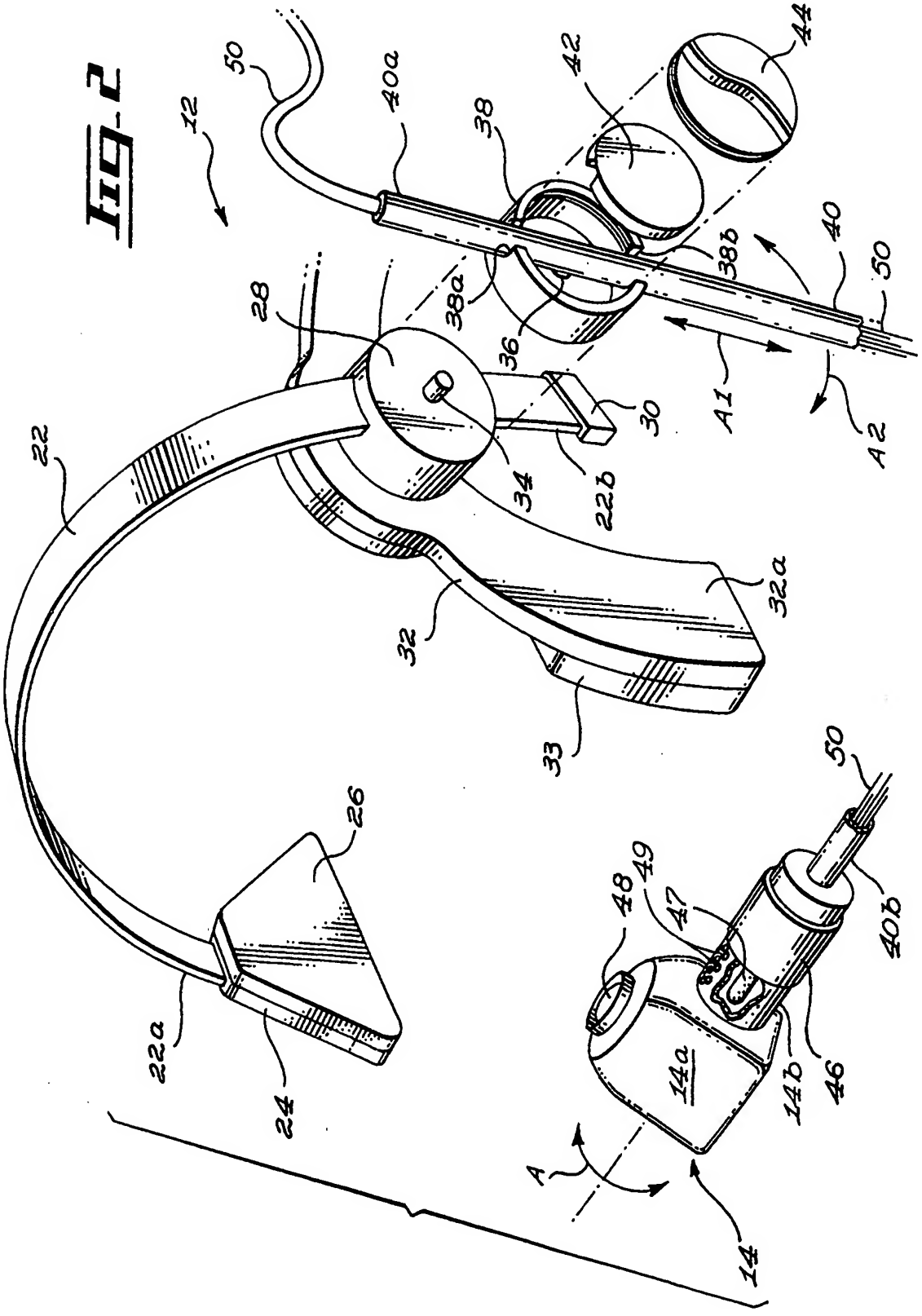

Fig. 3

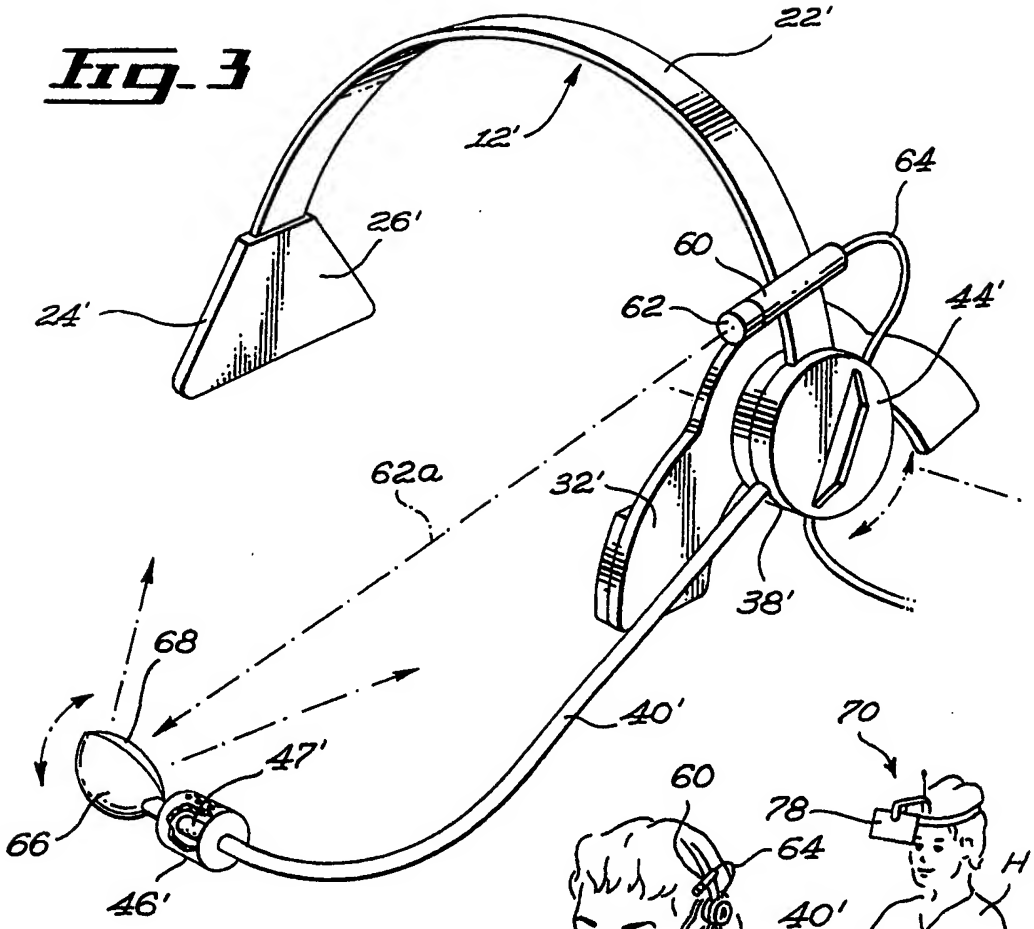

Fig. 4

Fig. 5